Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

FACT SHEET 71

IBM Canada Ltd.

23 de l'Aéroport Boulevard
Bromont, Quebec
J0E 1L0

A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The IBM CANADA LTD. plant in Bromont is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Electronic component manufacturing

The IBM CANADA LTD. plant in Bromont specializes in the packaging and testing of electronic components used in manufacturing the entire range of IBM products and those of other manufacturers. A wide range of technologies are used to produce an extensive range of products. Multilayer ceramic production includes finishing (cleaning and plating), electrical checking and brazing. Assembly of flat-packs (microprocessors and other semi-conductor circuits), memory modules and logic modules requires a number of techniques including the following, depending on the product: chip placement, chip microsoldering, wire bonding, epoxy dispense, encapsulation, moulding, dicing, burn-in and testing. The chips are then tested. Annual production capacity of the plant is 200 000 000 parts. In 1997, the plant operated at 72.5% design capacity and employed a work force of 2559.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Glass
- Plastic
- Ceramics
- Plating solutions
- Solvents
- Flux (welding)

FINISHED PRODUCTS

- Memory modules
- Logic modules
- Processors
- Multilayer ceramics
- Metal ceramics

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Metals found

Based on company data, in 1993 effluent from the inorganic treatment system and slightly contaminated water discharged into the Yamaska River had a flowrate of 443 m^3/d and contained notably:

- 7.75 kg/d of chemical oxygen demand (COD)
- 1.35 kg/d of suspended solids (SS)
- 1.06 kg/d of biochemical oxygen demand (BOD_5)
- 0.06 kg/d of nickel
- 0.01 kg/d of copper
- 0.004 kg/d of lead
- 0.0004 kg/d of tetrachloroethylene

RESOURCES AND USES TO PRESERVE

Major vacation area

Part of the effluent from IBM CANADA LTD. flows into the Yamaska, while domestic sewage and the remainder of the industrial wastewater are discharged into the Bromont sewage treatment plant. Because the Appalachians and Brome Lake are upstream of the Yamaska, the region is an ideal recreation area. Between Bromont airport and the mouth of the Yamaska Nord downstream from the IBM CANADA LTD. plant, there are a number of vacation spots. Pedal-boat, canoe and sport-fishing enthusiasts use the area. There is a campground at Brigham, a few kilometres from Adamsville. The area between Brome Lake and the Adamsville Basin contains at least 28 fish species. There is a large spawning ground for walleye and smallmouth bass in the Farnham Islands. The first drinking water intake downstream from the plant discharge point is at Farnham.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for IBM CANADA LTD. are available on request.

EFFLUENT TREATMENT

Physico-chemical treatment

Wastewater containing inorganic matter is treated in a multi-stage physico-chemical treatment system that includes polymer precipitation, flocculation, clarification (lamellar clarifiers) and sand filtration. Effluent pH is adjusted. Sludge is piped to a dewatering system. Since November 1994, slightly contaminated water has been re-used during warm weather (six months a year).

Organic wastewater undergoes physico-chemical pretreatment to reduce metal loads. Since August 1992, this water has been sent to the Bromont sewage treatment plant for treatment. Domestic sewage is also treated at the Bromont treatment plant.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Several cleanup projects

IBM CANADA LTD. stopped using CFCs and methylchloroform in September 1992 and April 1993 respectively; these substances are targeted by the new Ozone-depleting Substances Regulations. Since 1992, the company has conducted water rationalization, separation and cleanup projects. Work aimed at reducing and separating rinse water was carried out in November 1992 and February 1993. In April 1994, modifications were made to the pretreatment system for water loaded with organics and a system for removing metals contained in this water was installed.

A rinse water re-use plan was implemented in November 1994 and continued in 1995 and 1996. The method of precipitating inorganic wastewater was modified in 1996 to improve effluent quality and decrease the amount of sludge produced by more than 50%.

REGULATORY COMPLIANCE - WATER COMPONENT

Standards met

The IBM CANADA LTD. plant in Bromont is subject to standards set by two certificates of authorization (CA). The first, issued on April 21, 1985, deals with water loaded with treated inorganic material; the second, issued on July 13, 1992, covers industrial effluent loaded with organic material. The company meets the standards of these two CAs.

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly arsenic

The Chimiotox index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (Table 1).

Table 1 shows August 1995 SLV 2000 characterization along with the Chimiotox values calculated from them, assuming an effluent flowrate of 690 m^3/d. Fifteen substances were selected in testing for more than 120. Based on these data, total arsenic accounts for 48% of the Chimiotox index, followed by nitrites-nitrates with 19%.

Figure 1 is plotted from 1995 SLV 2000 characterization and data from a complementary characterization carried out by the company in 1997 for some substances. The Chimiotox index calculated from the 1995 data was reported unchanged for 1993 to 1996. The 1997 Chimiotox index was modified in light of the results of the 1997 characterization, which was reported unchanged for 1998.

Table 1 ***Chimiotox Index (1995) - IBM Canada Ltd.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total arsenic	0.005	57 143	294
Nitrites-nitrates	23.247	5	116
Total phosphorus	1.320	50	66
Mineral oil and grease	0.450	100	45
Total beryllium	0.002**	15 601	35
Total copper	0.059	451	26
Total mercury	6.01×10^{-5}**	166 667	10
Ammonia nitrogen	8.782	0.8	7
Total thallium	0.057**	125	7
Total aluminum	0.094**	11	1
Total iron	0.172	3.3	1
Total nickel	0.072	10	1
Total manganese	0.038	10	<1
Total molybdenum	0.021**	1	<1
Total zinc	0.018	9.4	<1
CHIMIOTOX INDEX			**612**

* Assuming an effluent flowrate of 690 m^3/d (15 substances selected in testing for more than 120).

** Load calculation based on analytical data which are near methodological detection limits.

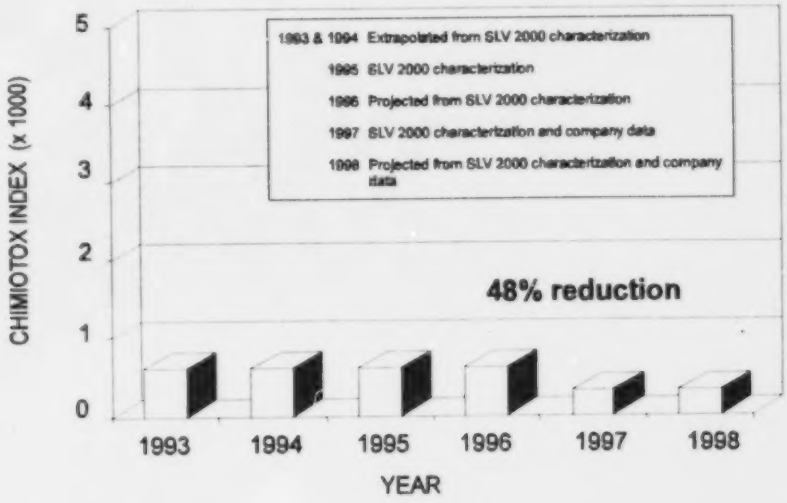


Figure 1 ***Chimiotox Index trends (1993 to 1998) IBM Canada Ltd.***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

The 1995 SLV 2000 characterization found one of these persistent toxic substances in effluent from IBM CANADA LTD., mercury, at a concentration near methodological detection limits. The environmental discharge objective for mercury was evaluated at 0.001 mg/L, the same concentration as the methodological detection limit.

During the 1997 complementary characterization, mercury was not present in the effluent. However, after a systematic search in 1997, the company found traces in a process residue and in two raw materials used as ingredients in wastewater treatment and to regenerate ion exchange resins for the demineralized water production system. It is thus possible that mercury is present in effluent but in concentration below methodological detection limits. The company has implemented management methods to decrease mercury in its effluent and is trying to eliminate their presence in raw materials used in wastewater treatment.

PEEP TOXICITY REDUCTION

Low toxicity

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. Results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of IBM CANADA LTD. plant, a series of bioassays was carried out in 1995; yielding a PEEP of 1.2 , and showing low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Increased production

Based on company data, in 1997 effluent from the inorganic treatment system discharged into the Yamaska River had a flowrate of 313 m^3/d, containing notably:

- 3.92 kg/d of chemical oxygen demand (COD)
- 1.10 kg/d of biochemical oxygen demand (BOD_5)
- 0.93 kg/d of suspended solids (SS)
- 0.057 kg/d of copper
- 0.049 kg/d of nickel
- 0.003 kg/d of lead

From 1993 to 1997, the plant's production increased by 70%. Cleanup and rationalization measures reduced effluent flowrate and some parameters despite the increased production.

KEY POINTS

- **A number of water rationalization, separation and cleanup projects were carried out between 1992 and 1997**
- **A 48% decrease in the Chimiotox index**

Information revised January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Éric Lampron (514) 534-5424

Environment officer at IBM CANADA LTD.:
Isidore Wasungu (514) 534-6875

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/71-1998E
ISBN 0-662-26539-4
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

FACT SHEET 72

Infasco Division of Ifastgroupe and Company, Limited Partnership

700 Ouellette Street
Marieville, Quebec
J3M 1P6

A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The INFASCO DIVISION OF IFASTGROUPE AND COMPANY, LIMITED PARTNERSHIP plant in Marieville is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Manufacture of bolts, nuts and specialty screws

The INFASCO plant in Marieville became a division of IFASTGROUPE AND COMPANY, LIMITED PARTNERSHIP in the fall of 1993; it was previously a division of IVACO INC. The plant makes nuts, bolts and specialty screws from steel wire. The wire is annealed, stripped using sulphuric acid, and then covered with phosphate and occasionally soap. The sulphuric acid used for stripping is regenerated by crystallization (Keramchemie process). The nuts are produced by hot forging. The finished products that require no additional heat treatment or coating are washed and stored awaiting shipment. The remaining nuts and bolts may undergo stress-relief, quenching in water or oil, and tempering. The quenched products are coated with rust inhibitor before being shipped. In 1994, the company ceased cold-forging of nuts; this operation was transferred to Ontario. Annual production capacity of the plant is 120 000 t. In 1997, the plant operated at 85% capacity and employed a work force of 530.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Steel wire in coils (low-carbon)
- Steel bars in coils (low-alloy, medium-carbon)
- Straight steel bars (low alloy, low-carbon)

FINISHED PRODUCTS

- Bolts
- Nuts
- Specialty screws

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Low loads

In 1993, based on company data, the plant discharged an average of 395 m^3/d of effluent, containing notably:

- 5.04 kg/d of chemical oxygen demand (COD)
- 3.25 kg/d of suspended solids (SS)
- 1.01 kg/d of iron
- 0.27 kg/d of total phosphorus
- 0.17 kg/d of zinc

RESOURCES AND USES TO PRESERVE

Intensive farming area

Effluent from the INFASCO DIVISION OF IFASTGROUPE AND COMPANY, LIMITED PARTNERSHIP plant is discharged into Barré creek, a tributary of the Saint-Louis creek which flows into the Hurons River which joins the right bank of the Richelieu at Chambly Basin. Cattle regularly drink in the Saint-Louis and Barré creeks. There is a spawning ground used by northern pike, perch and carp at the mouth of the Hurons River. This river drains an area of intensive farming, where water quality is judged mediocre. Between the plant and Chambly Basin, the only recreational area identified is a campground on the north shore of the Hurons River, at the mouth of Saint-Louis creek. The main focus of recreational activities is the Richelieu. Chambly Basin is also used for many activities such as fishing, swimming and various other water sports. The first drinking water intake downstream from the plant is in Chambly Basin near the left bank of the Richelieu, used by Goyer, Lièvres and Demers islands.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for INFASCO DIVISION OF IFASTGROUPE AND COMPANY, LIMITED PARTNERSHIP are available on request.

EFFLUENT TREATMENT

Physico-chemical treatment

Industrial wastewater from the stripping shop receives physico-chemical treatment in three stages: pH stabilization, settling and filtration. Water from the hot-forging and quenching shops is re-used in the manufacturing process. Depending on the discharge point in the plant, rainwater, boiler purge water and compressor cooling water are discharged either untreated into the Barré creek or into the municipal storm sewer system. Domestic sewage is sent to the Marieville sanitary sewer system.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

No special measures

No additional cleanup measures have been taken since 1993.

REGULATORY COMPLIANCE - WATER COMPONENT

Standards met

The INFASCO DIVISION OF IFASTGROUPE AND COMPANY, LIMITED PARTNERSHIP plant is subject to the standards of a certificate of authorization on effluent which the company has met.

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly anthracene

The Chimiotex index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years and determine the toxic contribution of each pollutant

Table 1 gives data from the March 1996 SLV 2000 characterization along with the Chimiotox values calculed from them, assuming an effluent flowrate of 342 m^3/d. Nine substances were selected in testing for more than 120. Based on these data, anthracene accounts for 92% of the Chimiotox index.

Figure 1 is plotted from 1996 SLV 2000 haracterization data. The Chimiotox index calculed from the 1996 data was applied to the years 1993 to 1998. No additional cleanup measures have been taken since 1993.

Table 1 ***Chimiotox Index - Infasco Division of Ifastgroupe and Company, Limited Partnership****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Anthracene	0.013	32 154	426
Nitrites-nitrates	4.711	5	24
Total phosphorus	0.152	50	8
Total aluminium	0.143	11	2
Ammonia nitrogen	0.795	0.8	1
Total cyanides	0.003	200	1
Total iron	0.417	3.3	1
Total manganese	0.107	10	1
Total molybdenum	0.532	1	1
CHIMIOTOX INDEX			**465**

*Assuming an effluent flowrate of 342 m^3/d (9substances selected in testing for more than 120).

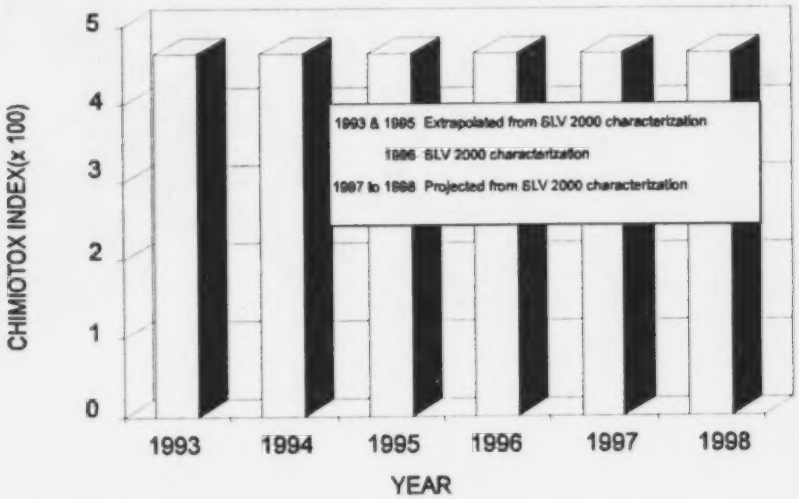


Figure 1: ***Chimiotox Index Trends (1993 to 1998)***
Infasco Division of Ifastgroupe and Company, Limited Partnership

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 targeted plants along the St. Lawrence and its tributaries. Thetargeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

Based on SLV 2000 characterization data for March 1996, none of the eleven persistent and bioaccumulative substances were detected in the company's effluent.

PEEP TOXICITY REDUCTION

Low toxicity

The Potential Ecotoxic Effects Probe, or PEEP, combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of INFASCO DIVISION OF IFASTGROUPE AND COMPANY, LIMITED PARTNERSHIP, a series of bioassays was conducted in March 1996, yielding a PEEP of 3 and showing a low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Stability of discharge

Based on company data for ten months of 1997, the plant discharged an average of 350 m^3/d of effluent, containing notably:

- 3.66 kg/d of chemical oxygen demand (COD)
- 2.16 kg/ of suspended solids (SS)
- 0.60 kg/d of iron
- 0.16 kg/d of total phosphorus
- 0.06 kg/d of zinc

Effluent loads and flowrate between 1993 and 1997 were stable owing to the lack of any major changes to the process or water treatment system.

KEY POINTS

- **Physico-chemical treatment system in place since 1985**

Information revised January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Hung Duc Phan (514) 928-7607 ext. 281

Environment officer at INFASCO DIVISION OF IFASTGROUPE AND COMPANY, LIMITED PARTNERSHIP:
Salim Brahimi (514) 658-8741

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca/

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/72-1998E
ISBN 0-662-26540-8
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

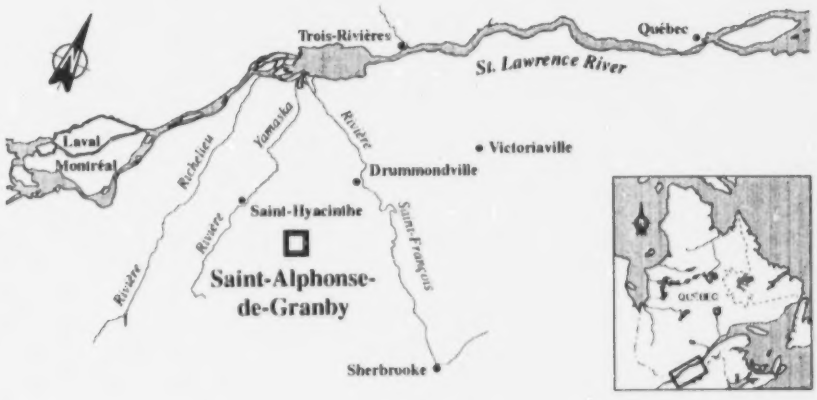
FACT SHEET 73

Le Manufacturier Granford inc.

127 rang Parent

Saint-Alphonse-de-Granby, Quebec

J0E 2A0



A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The LE MANUFACTURIER GRANFORD INC. plant in Saint-Alphonse-de-Granby is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Manufacture of rubber hose

The LE MANUFACTURIER GRANFORD INC. plant in Saint-Alphonse-de-Granby manufactures rubber hose of different diameters. The raw materials are prepared and then sent to the production unit. The products are inspected before packaging and shipping. In 1997, the plant operated at 100% design capacity and employed a work force of 215.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Unvulcanized rubber
- Fabric reinforcement
- Zinc stearate powder
- Mineral oil
- Nylon curing tape

FINISHED PRODUCT

- Rubber hose (3/8 to 20 in. in diameter)

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Small loads

According to company data, in 1993 the plant discharged 70 m^3/d of effluent, containing notably:

- 1.33 kg/d of oil and grease (O&G)
- 0.91 kg/d of suspended solids (SS)
- 0.56 kg/d of biochemical oxygen demand (BOD_5)
- 0.01 kg/d of zinc

RESOURCES AND USES TO PRESERVE

Centre of industrial activity

The LE MANUFACTURIER GRANFORD INC. plant in Saint-Alphonse-de-Granby empties its effluent into the upstream part of the Yamaska drainage basin. The plant is several kilometres south of Granby, a major industrial centre close to the west bank of the Yamaska Nord River that is home to a large percentage of the region's population and much of its industry. There has been no recent study of fish inhabiting this stretch of the Yamaska Nord, long recognized as one of the most polluted rivers in Quebec. In the 1970s, some twenty fish species were inventoried in the Yamaska Nord as a whole. Water quality has improved since the Granby, Warden and Waterloo wastewater treatment plants were commissioned and the Choinière reservoir was built. The main channel of the Yamaska downstream of the discharge point, around Farnham, attracts anglers and is used for water sports. The town of Farnham draws its drinking water from the Yamaska.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for LE MANUFACTURIER GRANFORD INC. are available on request.

EFFLUENT TREATMENT

Recirculation

At this time, industrial wastewater is not treated. However, the company is looking for an effective technology to decrease the quantity of oil and grease in its effluent. Water used in the manufacturing process is partly recirculated. Domestic sewage is treated in septic tanks with tile drainage beds.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Oil and grease recovery

Since 1991, the company has been triyng to recover oil and grease. However, the results achieved with existing equipment have proved inadequate and a new oil and grease treatment or recovery system is planned for 1998.

REGULATORY COMPLIANCE - WATER COMPONENT

Application for a certificate of authorization

LE MANUFACTURIER GRANFORD INC. has applied for a certificate of authorization. The company will have to comply with standards stipulated in the certificate of authorization, which should be issued in 1998.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly oil and grease

The Chimiotox index gauges the load of all toxic substances in industrial effluent using the toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (Table 1).

Table 1 gives SLV 2000 characterization data collected in December 1995 along with the Chimiotox values calculated from them, assuming an effluent flowrate of 93 m^3/d. Eleven substances were selected in testing for more than 120. According to these data, total oil and grease dominate the treated effluent, accounting for 86% of the Chimiotox index.

Figure 1 is plotted from the 1995 SLV 2000 characterization data. The Chimiotox index calculated from these data was applied to the entire period between 1993 and 1998. No major modifications to the manufacturing process were made between 1993 and 1998.

Table 1 ***Chimiotox Index (1995) - Le Manufacturier Granford inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total oil and grease	3.099	100	310
Dimethylphthalate	0.008	5 000	40
Total phosphorus	0.144	50	7
Total copper	0.004 **	451	2
Total mercury	5.9×10^{-6} **	166 667	1
Ammonia nitrogen	0.235	0.8	<1
Total sulphates	0.001 **	500	<1
Total aluminum	0.007	11	<1
Total iron	0.086	3.3	<1
Total manganese	0.043	10	<1
Total zinc	0.024	9.4	<1
CHIMIOTOX INDEX			**360**

* Assuming a flowrate of 93 m^3/d (11 substances selected in testing for more than 120).

** Load calculation based on analytical data which are near methodological detection limits.

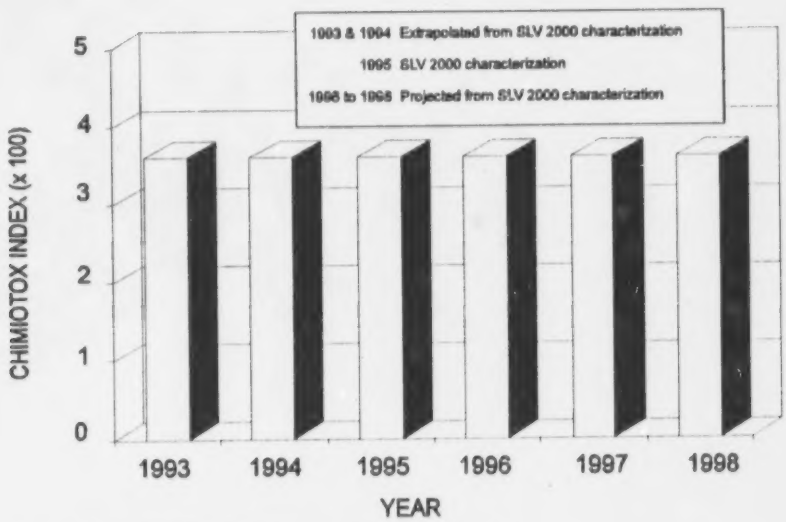


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Le Manufacturier Granford inc.***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

Mercury was detected during the 1995 SLV 2000 characterization; its concentration was near the methodological detection limit. Low concentrations of mercury were also found in the plant's water supply.

PEEP TOXICITY REDUCTION

Low PEEP

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. Results are expressed on a logarithmic scale of increasing toxicity ranging fron 1 to 10 and are used to monitor discharge trends over the years. In the case of LE MANUFACTURIER GRANFORD INC. plant, a series of bioassays was conducted in 1995; yielding a PEEP of 2, which is low.

REDUCTION IN SUBSTANCES MONITORED

No major changes

According to company data, in 1997 the plant discharged 86 m^3/d of effluent, containing notably:

- 3 kg/d of oil and grease (O&G)
- 3 kg/d of suspended solids (SS)
- 3 kg/d of biochemical oxygen demand (BOD_5)
- 0.03 kg/d of zinc

There were no major changes in effluent flowrate and loads between 1993 and 1997.

KEY POINTS

- **A new oil and grease treatment or recovery system is planned for 1998**

Information revised January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Éric Lampron (514) 534-5424

Environment officer at LE MANUFACTURIER GRANFORD INC.:
Pierre Faust (514) 375-5050, ext. 232

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/73-1998E
ISBN 0-662-26541-6
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

FACT SHEET 74

Montupet Ltd

500 Léger Street
Rivière-Beaudette, Quebec
J0P 1R0

***A** list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.*

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The MONTUPET LTD plant in Rivière-Beaudette is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Aluminum engine parts production

The MONTUPET LTD plant in Rivière-Beaudette produces aluminum engine parts. Aluminum alloys received in ingot form are melted in natural gas furnaces. The molten metal is then transferred to a casting ladle and sent to holding furnaces. In the moulding operation, metal cores are placed in two metal half-moulds. The moulds are closed and the metal is poured. The part is then removed and placed in a cooling tunnel. Finishing includes decoring, removal of risers, deburring and machining. Quality is monitored at the end of the process. Since the SLV 2000 characterization in 1995, the plant has gradually increased its annual production capacity from 7000 to 14 500 t. In 1997, the plant operated at 75% capacity and employed a work force of 400.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Aluminum
- Silica sand
- Cutting oil
- Hydraulic oil
- Triethylamine
- Liquid nitrogen
- Sulphuric acid
- Phosphoric acid
- Isocure resin
- Phenolic resin
- Metal treatment products
- Zyglopenetrating agent

FINISHED PRODUCTS

- Aluminum cylinder heads
- Aluminum cylinder blocks
- Aluminum crancases

FACT SHEET 74

Montupet Ltd

500 Léger Street
Rivière-Beaudette, Quebec
J0P 1R0

***A** list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.*

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The MONTUPET LTD plant in Rivière-Beaudette is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Aluminum engine parts production

The MONTUPET LTD plant in Rivière-Beaudette produces aluminum engine parts. Aluminum alloys received in ingot form are melted in natural gas furnaces. The molten metal is then transferred to a casting ladle and sent to holding furnaces. In the moulding operation, metal cores are placed in two metal half-moulds. The moulds are closed and the metal is poured. The part is then removed and placed in a cooling tunnel. Finishing includes decoring, removal of risers, deburring and machining. Quality is monitored at the end of the process. Since the SLV 2000 characterization in 1995, the plant has gradually increased its annual production capacity from 7000 to 14 500 t. In 1997, the plant operated at 75% capacity and employed a work force of 400.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Aluminum
- Silica sand
- Cutting oil
- Hydraulic oil
- Triethylamine
- Liquid nitrogen
- Sulphuric acid
- Phosphoric acid
- Isocure resin
- Phenolic resin
- Metal treatment products
- Zyglopenetrating agent

FINISHED PRODUCTS

- Aluminum cylinder heads
- Aluminum cylinder blocks
- Aluminum crankcases

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Presence of phosphorus

According to 1995 SLV 2000 characterization data, in 1993 the plant discharged an average of 1237 m³/d of effluent, containing notably:

- 7.6 kg/d of suspended solids (SS)
- 6.9 kg/d of total hydrocarbons
- 4.6 kg/d of total organic carbon (TOC)
- 3.9 kg/d of total phosphorus
- 0.5 kg/d of iron

RESOURCES AND USES TO PRESERVE

A priority area

Effluent from the MONTUPET LTD plant in Rivière-Beaudette is discharged into the storm sewer system of the municipal industrial park. The storm sewer system flows into an infiltration pond near the Beaudette River, a tributary of Lake Saint-François. Spawning grounds for walleye and smallmouth bass are located about 3 km upstream from the mouth of the Beaudette River. Fishing season regulations apply to the area. Apart from walleye and bass, a dozen other fish species are found in the river. A dense bird population lives on the lake near the mouth of the Beaudette River, and a number of duck species also use the area during migration and breeding. This wetland environment is a priority protection area.

The Beaudette River and Lake Saint-François are used for many recreational activities. The north shore of the lake contains campgrounds, boat ramps and beaches, while sport fishing, commercial fishing and water sports are practised on the lake. Saint-Zotique draws its drinking water from Lake Saint-François about 6.5 km downstream from the mouth of the Beaudette River.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. There are no environmental discharge objectives for MONTUPET LTD.

EFFLUENT TREATMENT

Primary treatment

Effluent passes through a sediment, oil and grease interceptor containing a quicklime contact acid neutralizer. The treated effluent is discharged into the storm sewer system of the municipal industrial park. A small amount (about 20%) of industrial wastewater is discharged untreated into the storm sewer system of the new section of the plant. This effluent is carried to the industrial park's storm sewer system.

Domestic sewage is carried by the domestic sewer system to the wastewater treatment plant of the Rivière-Beaudette municipal industrial park. This facility consists of a septic tank equipped with a tile bed.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Recovery and regeneration

Phosphorus discharges were eliminated in 1996 following a stop in the production of an engine manifold that used phosphoric acid for quality control to prevent corrosion of manifolds.

In addition, MONTUPET LTD introduced measures to increase its capacity without increasing its water consumption and wastewater discharges. For example, the exchange of heat to cool hydraulic power units was optimized.

MONTUPET LTD also identified sources of effluent contamination by oil and grease. The majority of the oil comes from quality control processes for its parts. Prevention measures, such as a review of methods to apply chemical products and clean parts, have been put in place. The quantities of water and products used per production unit have thus been reduced. This has resulted in a decrease of 2 to 3 kg/d in the oil and grease load.

REGULATORY COMPLIANCE - WATER COMPONENT

No specific regulations

Effluents from the MONTUPET LTD plant in Rivière-Beaudette is not subject to any specific regulations.

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly total oil and grease

The Chimiotox index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (Table 1).

Table 1 gives data from the SLV 2000 characterization carried out in September 1995 along with Chimiotox values claculated from them, assuming an effluent flowrate of 1237 m^3/d. Seven substances were selected in testing for more than 120. Based on these data, total oil and grease dominates in the treated water, accounting for 76% of the Chimiotox index, followed by total phosphorus with 22%.

Figure 1 is plotted from 1995 SLV 2000 characterization data and company data collected in 1997. The Chimiotox index calculated from these data was reported unchanged for 1993 to 1996. For 1997 and 1998, the Chimiotox index is based on data provided by the company for 1997. Reductions are attribuable to prevention measures and changes in production introduced by the company.

Table 1 ***Chimiotox Index (1995) - Montupet Ltd****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total oil and grease	6.880	100	688
Total phosphorus	3.895	50	195
Total copper	0.017	451	8
Total sulphides	0.014**	500	7
Total iron	0.749	3.3	2
Total manganese	0.173	10	2
Nitrites-Nitrates	0.075**	5	<1
CHIMIOTOX INDEX			**902**

* Assuming an effluent flowrate of 1237 m^3/d (7 substances selected in testing for more than 120).

**Load calculation based on analytical data which are near methodological detection limits.

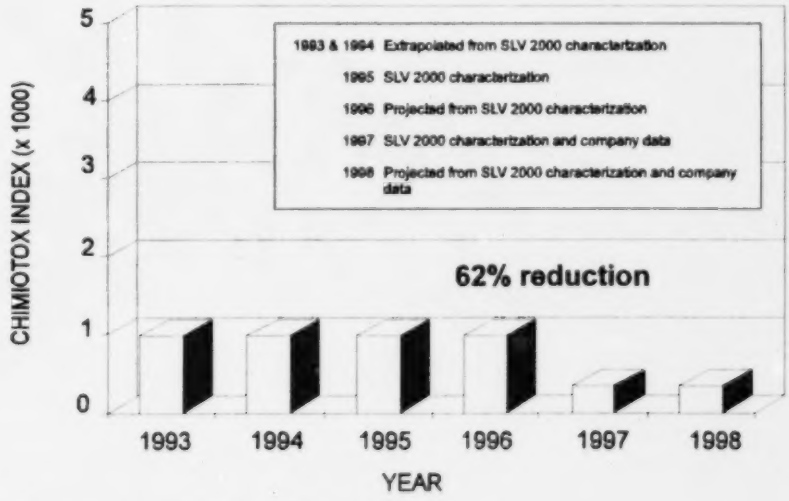


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Montupet Ltd***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo-(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

Based on 1995 SLV 2000 characterization data, none of the eleven targeted persistent and bioaccumulative toxic substances was detected in the company's effluent.

PEEP TOXICITY REDUCTION

Low toxicity

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the MONTUPET LTD plant, a series of bioassays was conducted in 1995, yielding a PEEP of 2.4, and showing only low toxicity.

REDUCTION IN SUBSTANCES MONITORED

Reduction in hydrocarbons and phosphorus

According to 1995 SLV 2000 characterization data and company data for 1997, the plant discharged 1237 m^3/d of effluent, containing notably:

- 7.6 kg/d of suspended solids (SS)
- 3.2 kg/d of hydrocarbons C_{10} to C_{50}
- 4.6 kg/d of total organic carbon (TOC)
- 0.5 kg/d of iron

Effluent remained stable from 1993 to 1997 with the exception of hydrocarbons and phosphorus, whose loads decreased by 54% and 100% respectively.

KEY POINTS

- **Elimination of phosphorus discharges in 1996**
- **Increase in production without an increase in water consumption or wastewater discharges**
- **A number of prevention measures introduced**
- **62% decrease in Chimiotox index**

Information updated January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Yvon Goulet (514) 370-3085

Environment officer at MONTUPET LTD:
Annie Hince (514) 269-2022

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address :
http://www.slv2000.qc.ec.gc.ca/

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/74-1998E
ISBN 0-662-26542-4
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

FACT SHEET 75

Norsk Hydro Canada Inc.

7000 Raoul-Duchesne Boulevard

Bécancour, Quebec

G0X 1B0

A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The NORSK HYDRO CANADA INC. plant in Bécancour is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

NDUSTRIAL PLANT

Magnesium and alloy production

The NORSK HYDRO CANADA INC. plant in Bécancour produces pure magnesium and alloys in ingots, T-bars and round bars. Production of primary magnesium includes the following stages:

- Magnesite ($MgCO_3$) is dissolved in hydrochloric acid (HCl) to produce magnesium chloride brine ($MgCl_2$).
- The brine is dried to produce magnesium chloride granules ($MgCl_2$ particles).
- The $MgCl_2$ is decomposed by electrolysis to produce metallic magnesium and chlorine gas.
- The magnesium is refined and alloyed.
- Chlorine gas from electrolysis is burned with hydrogen to produce hydrochloric acid, which is recycled to the beginning of the process.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Magnesite
- Hydrochloric acid
- Hydrogen
- Natural gas
- Soda
- Hypochlorite
- Magnesium alloy scraps
- Alloy metals

FINISHED PRODUCTS

- Pure magnesium
- Magnesium alloys

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Low loads

Based on company data, in 1993 the plant discharged 18 120 m^3/d of effluent, containing notably:

- 278 kg/d of suspended solids (SS)
- 4 kg/d of aluminum

RESOURCES AND USES TO PRESERVE

Wide variety of habitats

The NORSK HYDRO CANADA INC. plant is located in the Bécancour industrial park along the banks of the St. Lawrence. The complex natural shape of the river in the area results in a wide variety of wildlife habitats. The infralittoral area facing the park contains water plant communities. A large mud flat rises in the middle of the St. Lawrence immediately downstream from the Bécancour wharf. The water plant communities in the area are considered attractive spawning and nursery areas for northern pike, perch, brown bullhead and smallmouth bass. Over 70 fish species and at least 26 species of water birds may be found in the vicinity. Hunting and fishing enthusiasts visit the Bécancour area, and sport fishing and muskrat trapping are particularly popular around the mouth of the Gentilly River. The nuclear power plant draws drinking and industrial water a short distance downstream from the Bécancour wharf.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for NORSK HYDRO CANADA INC. have been calculated and are available on request.

EFFLUENT TREATMENT

Neutralization and sedimentation

Effluent treatment equipment has been installed to recycle and re-use liquid and gaseous waste inside the plant. A water neutralization facility and sedimentation tank are the only equipment required before discharging effluent into the river. The sedimentation tank keeps suspended solids under 30 g/m^3, while the neutralization facility keeps pH between 5.5 and 9.5. Domestic sewage is discharged into the domestic sewer system of the Bécancour industrial park. Indirect cooling water flows into the river through a diversion ditch around the plant following monitoring for pH, conductivity and oxidation-reduction potential.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Several measures

A number of measures have been adopted to make better use of resources and limit losses. In 1988, a dike was built to recycle off-spec brine, along with a heat exchanger to re-use HCl; in 1992, a system to dissolve off-spec $MgCl_2$ granules and a furnace to melt magnesium scraps was installed, and in February 1994, a flocculation/sedimentation system was introduced to remove chlorinated aromatic hydrocarbons.

These measures required an investment of over $11 million. In addition, every year NORSK HYDRO CANADA INC. produces a detailed environmental status report that gives an update on the quality of the water, air, soil and environment around the plant. To prepare this report, up to 6000 facts and figures are collected every year; the report is available on request.

REGULATORY COMPLIANCE - WATER COMPONENT

Standards met

Effluent from the NORSK HYDRO CANADA INC. plant meets the discharge standards specified in the certificate of authorization issued in 1988 and updated in October 1993 and January 1997. It defines, among other things, discharge standards for the company.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

8 substances selected

The Chimiotox index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (Table 1).

Table 1 gives data from the October 1995 SLV 2000 characterization along with the Chimiotox values calculated from them, assuming an effluent flowrate of 25 337 m^3/d. Eight substances were selected in testing for more than 120. The Chimiotox index is below the average for the 106 SLAP and SLV 2000 plants.

Figure 1 is plotted from 1995 SLV 2000 characterization data, and company data for 1997 and 1998. The Chimiotox index calculated from the 1995 data was reported unchanged for 1993-1996. Reductions in 1997 and 1998 are the result of measures introduced by the company to reduce water consumption and toxic loads.

Table 1 ***Chimiotox Index (1995) - Norsk Hydro Canada Inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total arsenic	0.034 **	57 143	1 934
Total copper	0.591 **	451	266
Total aluminum	11.065	11	122
Total iron	23.064	3.3	76
Total phosphorus	1.432	50	72
Nitrites-nitrates	5.900	5	30
Total manganese	1.740	10	17
Ammonia nitrogen	1.855	0.8	1
CHIMIOTOX INDEX			**2 518**

* Assuming an effluent flowrate of 25 337 m^3/d (8 substances selected in testing for more than 120).

** Load calculation based on analytical data which are near methodological detection limits.

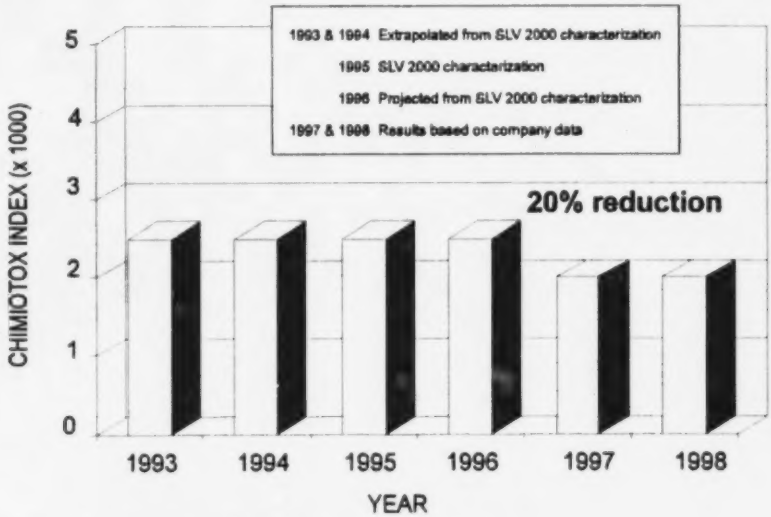


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Norsk Hydro Canada Inc.***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

Based on 1995 SLV 2000 characterization data, none of these eleven persistent and bioaccumulative toxic substances was detected in the company's effluent.

PEEP TOXICITY REDUCTION

Non toxic effluent

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. Results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the NORSK HYDRO CANADA INC. plant, a series of bioassays was carried out in 1995 yielding a PEEP of less than 0.7, and showing no toxicity in the company's effluent.

REDUCTION IN SUBSTANCES MONITORED

Increased production

According to company data, in 1997 the plant discharged 25 170 m^3/d of effluent, containing notably:

- 317 kg/d of suspended solids (ss)
- 9 kg/d of aluminum

Between 1993 and 1997, effluent flowrate increased 39% and the suspended solids 14%. These increases were due to a 120% increase in production between 1993 and 1997. However, water consumption per tonne of magnesium produced decreased by 33% over the same period.

KEY POINTS

- **A number of source reduction and resource enhancement measures implemented between 1988 and 1994, for an investment of over $11 million**
- **20% reduction in the Chimiotox index**
- **Non-toxic effluent**

Information revised January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 # 4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Pierre Chaîné (819) 371-6581 # 2007

Environment officer at NORSK HYDRO CANADA INC.:
Jean Laperrière (819) 294-4534

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/75-1998E
ISBN 0-662-26543-2
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

FACT SHEET 76

Nova PB Inc.

1200 Garnier St.
Sainte-Catherine, Quebec
J0L 1E0

A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The NOVA PB INC. plant in Sainte-Catherine is part of Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Refined metallic lead production

The NOVA PB INC. plant in Sainte-Catherine produces different grades of refined lead in a three-stage process that includes shredding of used batteries, melting and refining. Lead-bearing material is melted and reduced in a rotary furnace and requires the addition of substances such as coke, iron filings and sodium carbonate. The refinery has eight 100-t crucibles. The various grades of refined lead are cast in 30-kg or 1-t blocks. Production capacity of the plant is 100 000 t/yr of refined lead. In 1998, the plant operates at 45% capacity and employs a work force of 135.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Old lead-acid batteries
- Lead-bearing materials
- Sodium carbonate
- Iron filings
- Alloy metals
- Waste oil
- Oil filters
- Paint pigments

FINISHED PRODUCTS

- Refined metallic lead
- Recycled polypropylene

FACT SHEET 76

Nova PB Inc.

1200 Garnier St.
Sainte-Catherine, Quebec
J0L 1E0

***A** list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.*

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The NOVA PB INC. plant in Sainte-Catherine is part of Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Refined metallic lead production

The NOVA PB INC. plant in Sainte-Catherine produces different grades of refined lead in a three-stage process that includes shredding of used batteries, melting and refining. Lead-bearing material is melted and reduced in a rotary furnace and requires the addition of substances such as coke, iron filings and sodium carbonate. The refinery has eight 100-t crucibles. The various grades of refined lead are cast in 30-kg or 1-t blocks. Production capacity of the plant is 100 000 t/yr of refined lead. In 1998, the plant operates at 45% capacity and employs a work force of 135.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Old lead-acid batteries
- Lead-bearing materials
- Sodium carbonate
- Iron filings
- Alloy metals
- Waste oil
- Oil filters
- Paint pigments

FINISHED PRODUCTS

- Refined metallic lead
- Recycled polypropylene

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Mainly sulphates

Based on company data, in 1993 the plant had an effluent discharge of 243 m^3/d, containing notably:

- 4617 kg/d of sulphates
- 0.049 kg/d of lead
- 0.041 kg/d of zinc

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. There are no environmental discharge objectives for NOVA PB INC. as the company aims to eliminate industrial effluent from the plant.

EFFLUENT TREATMENT

Two-stage treatment

Industrial wastewater is first neutralized using sodium carbonate; suspended lead is recovered in a thickener and a drum filter and then re-used. The neutralized water and drainage water from the land around the plant are treated in the plant sewage treatment system, which includes a settling tank, a retention tank, a neutralization tank, a flocculation tank and a clarifier. Depending on the volume of water treated, some or all of the treated water is used in the conditioning chambers located downstream of the rotary kilns. The settling tank is drained once a year and the sludge recycled into the plant. Domestic sewage is discharged into the public sewer system connected to the sewage treatment plant of the Régie régionale du bassin de La Prairie, where it is treated using activated sludge.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Changes to the treatment system and «zero discharge» objective

In 1995, NOVA PB INC. modified its plant wastewater system to improve performance. Flocculants were replaced, a second neutralization unit was added, and the control system and analysis methods were improved. Beginning in 1998, a second rotary kiln became operational to better re-use water from the wastewater treatment unit. In 1999, the company also plans to implement a new process to recover sulphates from battery electrolyte water. As a result, this water would no longer be channelled to the treatment unit, which should enable the company to reach its "zero discharge" objective.

REGULATORY COMPLIANCE - WATER COMPONENT

Compliance with standards

The NOVA PB INC. plant in Sainte-Catherine is governed by the standards of an authorization issued on September 16, 1985, for the water treatment system and the standards of the certificate of authorization issued on July 17, 1992. The company complies with the standards to which it is subject.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

No characterization

The Chimiotox index gauges the load of all toxic substances present in industrial effluent, using the toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years and determine the toxic contribution of each pollutant.

Starting in 1999 NOVA PB INC. will discharge no further effluent in the normal course of its operations, no characterization has been carried out during SLV 2000.

Table 1 ***Chimiotox Index - Nova PB Inc.***

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
There will be no exhaustive effluent characterization for the NOVA PB INC. plant in Sainte-Catherine, since the company will discharge no further industrial effluent starting in 1999.			
CHIMIOTOX INDEX			**N/A**

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

No characterization has been conducted during SLV 2000. The company plans to eliminate liquid effluent from the plant in 1999. Only domestic sewage will be discharged into the municipal sewer system.

PEEP TOXICITY REDUCTION

No PEEP

The Potential Ecotoxic Effects Probe, or PEEP, combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the NOVA PB INC. plant, PEEP was not measured.

REDUCTION IN SUBSTANCES MONITORED

Sulphates discharge increased

Based on company data, in 1997 the plant discharges 230 m^3/d of effluent, containing notably:

- 7130 kg/d of sulphates
- 0.039 kg/d of zinc
- 0.039 kg/d of lead

From 1993 to 1997, sulphate discharge increased while other discharges remained relatively stable. The plant aims to completely eliminate liquid effluent discharges in 1999.

KEY POINTS

- **Modifications to the wastewater treatment in 1995**
- **"Zero discharge" objective in 1999**

Information revised January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune (MEF):
Jean Latulipe (514) 928-7607 ext. 276

Environment officer at NOVA PB INC.:
Roger D. Laporte (514) 632-9910

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998
Catalogue No. En153-6/73-1998E
ISBN 0-662-26544-0
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

FACT SHEET 77

Alcan Smelters and Chemicals Ltd, Laterrière Works

6301 Talbot Blvd.
Laterrière, Quebec
G0V 1K0

A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The ALCAN SMELTERS AND CHEMICALS LTD, LATERRIÈRE WORKS is part of Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Modern plant

The ALCAN SMELTERS AND CHEMICALS LTD, LATERRIÈRE WORKS facility has been in operation since November 1989. The smelter manufactures aluminum in two series of prebaked anode electrolytic pots, consisting of 216 tanks each. The aluminum thus produced is either shipped in liquid form to other divisions of ALCAN or cast into ingots at the plant. The LATERRIÈRE WORKS facility can cast up to 4810 tonnes per week. ALCAN's Grande-Baie plant manufactures the prebaked anodes for Laterrière and removes cathode pot linings. Annual production capacity of the Laterrière smelter is 215 000 tonnes of aluminum. In 1997, the plant operated at 97% capacity and employed a work force of 607.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Alumina
- Aluminum fluoride
- Cryolite
- Cathode blocks
- Prebaked anodes

FINISHED PRODUCTS

- Laminated aluminum ingots
- Liquid aluminum (for neighbouring plants)

FACT SHEET 77

Alcan Smelters and Chemicals Ltd, Laterrière Works

6301 Talbot Blvd.

Laterrière, Quebec

G0V 1K0

***A** list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.*

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The* ALCAN SMELTERS AND CHEMICALS LTD, LATERRIÈRE WORKS *is part of Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Modern plant

The ALCAN SMELTERS AND CHEMICALS LTD, LATERRIÈRE WORKS facility has been in operation since November 1989. The smelter manufactures aluminum in two series of prebaked anode electrolytic pots, consisting of 216 tanks each. The aluminum thus produced is either shipped in liquid form to other divisions of ALCAN or cast into ingots at the plant. The LATERRIÈRE WORKS facility can cast up to 4810 tonnes per week. ALCAN's Grande-Baie plant manufactures the prebaked anodes for Laterrière and removes cathode pot linings. Annual production capacity of the Laterrière smelter is 215 000 tonnes of aluminum. In 1997, the plant operated at 97% capacity and employed a work force of 607.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Alumina
- Aluminum fluoride
- Cryolite
- Cathode blocks
- Prebaked anodes

FINISHED PRODUCTS

- Laminated aluminum ingots
- Liquid aluminum (for neighbouring plants)

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Fluorides and aluminum

Based on company data, in 1993 the plant discharged an average of 667 m^3/d of effluent, containing notably:

- 193 kg/d of dissolved solids (DS)
- 45 kg/d of chemical oxygen demand (COD)
- 8.2 kg/d of fluorides
- 1.1 kg/d of aluminum
- 0.16 kg/d of mineral oil and grease (O&G)

RESOURCES AND USES TO PRESERVE

A sport fishing area

The ALCAN SMELTERS AND CHEMICALS LTD, LATERRIÈRE WORKS plant is about 15 km south of downtown Chicoutimi. It is located on a site near Dalle and Saint-Gelais lakes. Plant effluents are discharged into the Moulin River. Rainwater and effluent are collected in a pond with an outfall in the middle of the river, about 2.5 kilometres upstream from Laterrière. There are sharp differences in elevation along the upper portion of the Moulin River, punctuated by many rapids; however, flow along the section on which the plant is located is relatively light. Sport fishing is practised on all parts of the river, with the main species caught being brook trout, lake whitefish, mullet and three-spine stickleback. Summer resorts are found mainly around Laterrière. The main centre of interest is Moulin town park, an area that includes several hiking paths. In populated areas, swimming, canoeing and kayaking are quite popular.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for ALCAN SMELTERS AND CHEMICALS LTD, LATERRIÈRE WORKS are available on request.

EFFLUENT TREATMENT

Modern treatment system with water recirculation

Direct cooling water from the casting unit is treated in a forced-air flotation cell, then returned to the casting unit. About 90 m^3/d of drained cooling water is processed through a pecan filter and sent to a holding pond. Compressor and air-conditioner cooling water (230 m^3/d) is recycled as make-up water in the casting centre. All rainwater is collected and channelled to the holding pond.

Particles are removed from garage and vehicle washwater, which is channelled to an oil separator, and then to the plant sewage treatment facility. Domestic sewage goes through an activated-sludge treatment process at the plant sewage treatment facility and is then channelled to the holding pond. Effluent from the pond is discharged into the Moulin river through a submerged outfall.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Reduction in fluorides

Changes to storage areas and electrolytic bath cooling areas in June 1993 made it possible to recover fluoride particles released into the atmosphere during handling of electrolytic baths. The investment cost was assessed at $3.7 million. The holding pond was also cleaned in September 1995 and August 1996 to remove fluorinated sediments. A general action plan to minimise fluoride sources was submitted in January 1998.

Concentrated oily water from direct cooling water treatment has been treated and reused in composting since the fall of 1994 by a specialized firm.

REGULATORY COMPLIANCE - WATER COMPONENT

Compliance with most standards

ALCAN SMELTERS AND CHEMICALS LTD, LATERRIÈRE WORKS complies with most standards on plant operation in the authorization certificate issued in November 1989 by the Ministère de l'Environnement et de la Faune du Québec (MEF). Standards were based on goals for discharge into the Moulin river and on the best technology available at that time. Standards for fluoride discharge concentrations have not always been met following a reduction in feed process water. Nevertheless, the fluoride discharge load standard has always been met.

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly arsenic

The Chimiotox index gauges the load of all toxic substances present in industrial effluent using the toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years and determine the toxic contribution of each pollutant.

Table 1 shows October 1996 SLV 2000 characterization data along with the Chimiotox values calculated from them, assuming an effluent flowrate of 566 m^3/d. Eleven substances were selected in testing for more than 120. Based on these data, arsenic was predominant, accounting for 51% of the Chimiotox index.

Figure 1 is plotted from 1996 SLV 2000 characterization data. The Chimiotox index calculated from the 1996 data was reported unchanged for 1993 to 1998. We were unable to quantify improvements made by the company and they were not reported on the figure.

Table 1 ***Chimiotox Index (1996) - Alcan Smelters and Chemicals Ltd, Laterrière Works****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total arsenic	0,001	57 143	77
Total phosphorus	0,718	50	36
Total oil and grease	0,193	100	19
Total aluminum	0,610	11	7
Total thallium	0,047	125	6
Total sulphides	0,010	500	5
Nitrites-nitrates	0,003	5	<1
Total iron	0,013	3,3	<1
Total manganese	0,012	10	<1
Total molybdenum	0,452	1	<1
Total zinc	0,042	9,4	<1
CHIMIOTOX INDEX			**151**

* Assuming an effluent flowrate of 566 m^3/d. Eleven substances were selected in testing for more than 120.

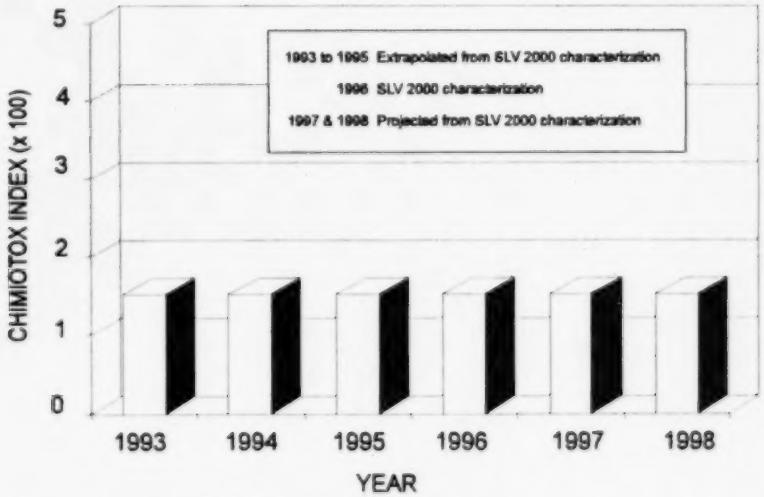


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Alcan Smelters and Chemicals Ltd, Laterrière Works***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

Based on 1996 SLV 2000 characterization data, none of the eleven persistent and bioaccumulative toxics were detected in the company's effluent.

PEEP TOXICITY REDUCTION

Low PEEP

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of ALCAN SMELTERS AND CHEMICALS LTD, LATERRIÈRE WORKS, a series of bioassays was conducted in connection with the SLV 2000 characterization in October 1996, yielding a PEEP of 2.2, and showing a low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Load reduction

Based on company data, in 1997 effluent average discharge was 625 m^3/d, containing notably:

- 152 kg/d of dissolved solids (DS)
- 11 kg/d of chemical oxygen demand (COD)
- 6.6 kg/d of fluorides
- 0.95 kg/d of aluminum
- 0.06 kg/d of mineral oil and grease (O&G)

Between 1993 and 1997, the chemical oxygen demand load in the effluent decreased by 75%, dissolved solids by 22%, fluorides by 20%, aluminum by 14% and mineral oil and grease by 62%. The reduction was due to the implementation of cleanup measures and prevention efforts made at contaminant discharge and emission sources.

KEY POINTS

- **Improvement of storage areas and electrolytic baths handling; a $3.7 million investment**
- **Action plans to reduce contaminant sources in August 1997 for $O\&G_{tot}$ and in January 1998 for fluorides; a $2 million investment**

Information updated January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune (MEF):
Martin Tremblay (418) 695-7883 # 316

Environment officer at ALCAN SMELTERS AND CHEMICALS LTD, LATERRIÈRE WORKS:
Luc Cyrenne (418) 678-1648

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/77-1998E
ISBN 0-662-26545-9
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

FACT SHEET 78

Sivaco Quebec, division of Ivaco Inc.

800 Ouellette Street
Marieville, Quebec
J3M 1P5

A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The SIVACO QUEBEC, DIVISION OF IVACO INC. works in Marieville is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Metal works

The SIVACO QUEBEC, DIVISION OF IVACO INC. works produces steel wire, nails (galvanized and ungalvanized) and wire mesh. The drawing stock is first cleaned mechanically or in an acid bath (sulphuric or hydrochloric acid) to remove surface oxide. Once cleaned, the wire coils are coated with lubricating film (lubricating soap, lime, phosphate or borax). The wire is rough drawn through dies to obtain the desired diameter, following which it can be sold as is or galvanized, made into nails or wire mesh or heat treated. Annual production capacity of the plant is about 180 000 t. In 1997, the plant employed a work force of 459.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Various grades of steel (wire coils)
- Lead and zinc ingots
- Powdered zinc
- Chemicals

FINISHED PRODUCTS

- Steel wire
- Galvanized wire
- Nails
- Galvanized nails
- Wire mesh

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Low loads

Based on company data, in 1993 the wastewater treatment system discharged 327 m^3/d of effluent, containing notably:

- 5.25 kg/d of suspended solids (ss)
- 0.77 kg/d of iron
- 0.1 kg/d of zinc
- 0.02 kg/d of total lead

RESOURCES AND USES TO PRESERVE

Farming area

Wastewater from SIVACO QUEBEC, DIVISION OF IVACO INC. flows into Barré creek, which is in turn a tributary of Saint-Louis creek, which flows into the des Hurons River. This river joins the Richelieu on its right bank at Chambly Basin. Herds of livestock drink from the Saint-Louis and Barré creeks. These two small streams probably contain minnows. There is also a promising habitat for northern pike and perch at the mouth of the des Hurons River. The drainage basin of the des Hurons River drains an area of intensive farming. There is a campground on the right bank of the river. Near the Chambly basin, the Richelieu is used for fishing, windsurfing and other water activities. The first drinking water intake is in the Chambly basin near the left bank of the Richelieu. The nearby filtration plant serves Goyer, Lièvres and Demers islands.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for SIVACO QUEBEC, DIVISION OF IVACO INC. have been calculated and are available on request.

EFFLUENT TREATMENT

Physico-chemical treatment

Some of the industrial wastewater undergoes physico- chemical treatment. The system includes a pre-neutralization tank, a primary neutralization tank, a coagulation and flocculation tank, and a settling tank. Sludge is thickened before going through two filter presses. Domestic sewage is discharged into the Marieville sanitary sewer system and treated with activated sludge at the municipal sewage treatment plant.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Many measures implemented

Since 1993, 9 mechanical decokers have been operating. This has resulted in a decrease of the effluent treatment loads and of the amount of sludge generated.

Since July 1997, a part of the acid discharged to the wastewater treatment system is recovered thanks to a modification of the cleaning system for the preparation of steel

Since January 1998, effluent of the lime tank is treated by the wastewater treatment system.

REGULATORY COMPLIANCE - WATER COMPONENT

Standards met

The SIVACO QUEBEC, DIVISION OF IVACO INC. works in Marieville is subject to discharge standards set by the certificate of authorization issued on January 27, 1987 for the installation of a wastewater treatment system. The company meets the standards to which it is subject.

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mostly oil and grease

The Chimiotox index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (Table 1).

Table 1 gives SLV 2000 characterization data collected in March 1996 along with the Chimiotox values calculated from them, assuming an effluent flowrate of 327.2 m³/d. Fifteen substances were selected in testing for more than 120. According to these data, oil and grease accounted for 80% of the total.

Figure 1 is plotted from 1996 SLV 2000 characterization data and on company data for 1998. The Chimiotox index calculated from SLV 2000 data was reported unchanged for 1993 to 1997 and was based on company data for 1998. Reduction in the Chimiotox index for 1998 results from implementations measures made by the company.

Table 1 ***Chimiotox Index (1996) - Sivaco Quebec, division of Ivaco Inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total oil and grease	7.219	100	722
Total arsenic	0.002	57 143	91
Total mercury	0.0002	166 667	36
Total lead	0.065	314	20
Total thallium	0.059	125	7
Total aluminum	0.671	11	7
Total lead	1.595	3.3	5
Total manganese	0.339	10	3
Total cadmium	0.003	909	3
Nitrites-nitrates	0.414	5	2
Total chromium	0.003	500	1
Total zinc	0.118	9.4	1
Ammonia nitrogen	0.462	0.8	<1
Cyanures totaux	0.003	200	<1
Total molybdenum	0.060	1	<1
CHIMIOTOX INDEX			**899**

* Assuming an effluent flowrate of 327.2 m³/d. (15 substances selected in testing for more than 120).

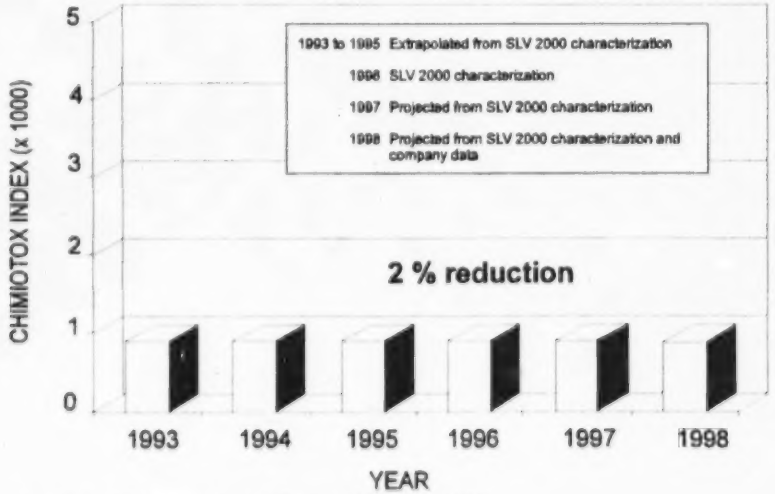


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Sivaco Quebec, division of Ivaco Inc.***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

The 1996 characterization showed the presence of one of the eleven persistent toxic substances, mercury. Its concentration (0.95 µg/L) was above the temporary environmental discharge objective for this substance (0.1 µg/L).

PEEP TOXICITY REDUCTION

Moderate toxicity

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. Results are expressed on a logarithmic scale ranging from 1 to 10 of increasing toxicity and are used to monitor discharge trends over the years. In the case of the SIVACO QUEBEC, DIVISION OF IVACO INC. works, a series of bioassays was conducted in 1996, yielding a PEEP of 3.8, and showing moderate toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Major load reductions

According to the SLV 2000 characterization, in 1996 the plant discharged 327.2 m^3/d of effluent, containing notably:

- 257.2 kg/d of suspended solids (SS)
- 1.6 kg/d of iron
- 0.13 kg/d of zinc
- 0.065 kg/d of total lead

From 1993 to 1996, the loads of all substances monitored increased in the treated effluent. In 1998 one untreated effluent remains with a low flowrate but a not inconsiderable iron and oil and grease loads. Otherwise, the improvements made by the company in 1998 to its wastewater treatment have reduce the treated effluent loads by:

- 92% for suspended solids (SS)
- 25% for chromium
- 19% for copper
- 7% for mercury
- 48% for lead
- 72% for aluminum
- 29% for iron.

KEY POINTS

- **The plant meets discharge standards in the certificate of authorization for installation of a wastewater treatment system**
- **Since 1993, implementation of many measures which have improved treated effluent quality**
- **A 2% decrease in the Chimiotox Index**

Information updated January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Lyne Longpré (514) 928-7607 #279

Environment officer at SIVACO QUEBEC, DIVISION OF IVACO INC.:
Denis Charbonneau (514) 658-8741

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/78-1998E
ISBN 0-662-26546-7
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

FACT SHEET 79

SKW Canada Inc.

6500 Yvon Trudeau
Bécancour, Quebec
G0X 1B0

A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The SKW CANADA INC. plant in Bécancour is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

A screening characterization has confirmed the absence of contaminants in SKW CANADA INC. effluent.

INDUSTRIAL PLANT

Silicon alloy production

The SKW CANADA INC. plant produces silicon and ferrosilicon alloys by mixing quartz (SiO_2), coal and wood chips. Steel turnings are added to the mixture to produce ferrosilicon. The mixture is sent to electric-arc furnaces where the quartz is reduced. Two furnaces are used to produce metallic silicon and one to produce ferrosilicon. The molten metal is then refined. Various alloys are then produced and the metal poured into cooling moulds. Once hardened, the metal is unmoulded, crushed, sieved and stored for shipment. A certain quantity of silicon is solidified through granulation. The molten metal is water cooled, dried and shipped. The plant has an annual production capacity of 28 000 t for ferrosilicon and 28 000 t for metallic silicon. In 1997, the plant operated at 100% capacity in both cases and employed a work force of 200.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Quartz
- Coal
- Wood chips
- Steel turnings

FINISHED PRODUCTS

- Ferrosilicon
- Metallic silicon
- Silica fume
- Scories

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Indirect cooling water

According to company data, in 1993 the effluent contained only indirect cooling water from the furnaces. The average effluent discharge was 18 000 m^3/d.

RESOURCES AND USES TO PRESERVE

A large mud flat

The SKW CANADA INC. plant is located in the Bécancour industrial park along the banks of the St. Lawrence. The complex natural morphology of the river lends itself to a wide variety of wildlife habitats. The infralittoral zone facing the park contains water-plant communities. Immediately downstream from the Bécancour wharf, a large mud flat rises in the middle of the river. Water-plant communities are considered ideal spawning and nursery areas for northern pike, perch, brown bullhead and smallmouth bass. Over 70 species of fish and at least 26 species of waterfowl can be found in the area. Hunting and fishing enthusiasts frequent the Bécancour area, with sport fishing and muskrat trapping being particularly popular at the mouth of the Gentilly River. The nuclear power station draws its drinking and industrial water a little downstream from the Bécancour wharf.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. No environmental discharge objectives has been calculated for SKW CANADA INC. as the plant discharges only a very small amount of industrial effluent.

EFFLUENT TREATMENT

Almost exclusively cooling waters

The process used at SKW CANADA INC. generates no effluent with the exception of the granulation process, which produces only a very small amount. Indirect cooling water from the furnaces is discharged into a ditch at the Bécancour industrial park. Domestic sewage is treated at the industrial park's facultative aerobic lagoon.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Silicon cooling

In 1995, a commercial-scale pilot unit was installed to produce water-cooled rather than air-cooled silicon. The unit was in operation for about ten months in 1997.

REGULATORY COMPLIANCE - WATER COMPONENT

Regulation for the granulation

The SKW CANADA INC. plant in Bécancour is not subject to any specific regulations for effluent with the exception of the granulation process.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

No characterization

The Chimiotox index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years and determine the toxic contribution of each pollutant.

Since the SKW CANADA INC. plant discharges almost no effluent, no exhaustive characterization will be carried out under SLV 2000. A screening characterization carried out in August 1995 confirmed the absence of contaminants in company effluent. Effluent from the granulation process has not been assessed, but it has a very low flowrate.

Table 1 ***Chimiotox Index - SKW Canada Inc.***

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
There will be no exhaustive effluent characterization for the SKW CANADA INC. plant in Bécancour since the company discharges no effluent. A screening characterization carried out in August 1995 confirmed the absence of contaminants in company effluent. Effluent from the granulation process has not been assessed.			
CHIMIOTOX INDEX			**N/A**

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

The SKW CANADA INC. plant in Bécancour produces no industrial effluent other than cooling waters and effluent from the granulation process, which has a very low flowrate.

PEEP TOXICITY REDUCTION

No PEEP

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the SKW CANADA INC. plant, only cooling waters are discharged and the PEEP value will not be calculated.

REDUCTION IN SUBSTANCES MONITORED

Cooling water only

According to company data, the plant produced no industrial effluent in 1997. Effluent is made up of indirect cooling water at an average flowrate of 15 000 m^3/d. A very small percentage of this flow is re-used in the new direct silicon cooling process.

KEY POINTS

- **Industrial effluent consists almost exclusively of cooling waters**
- **Testing of direct water-cooling process**

Information updated January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 # 4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Pierre Chaine (819) 371-6581 # 2007

Environment officer at SKW CANADA INC.:
Jean Bergeron (819) 294-6000 # 234

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/79-1998E
ISBN 0-662-26547-5
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

FACT SHEET 80

Société Canadienne de Métaux Reynolds, div. Usine de tige Reynolds

6900 Raoul-Duchesne Blvd.
Bécancour, Quebec
G0X 1B0

A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The SOCIÉTÉ CANADIENNE DE MÉTAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant in Bécancour is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Manufactures aluminum rods

The SOCIÉTÉ CANADIENNE DE MÉTAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant in Bécancour manufactures aluminum rods. Aluminum is smelted in natural gas furnaces, continuously cast and then water cooled. The bars obtained are then crushed in a series of rollers to produce round rods 3/8 to 11/16 in. in diameter. The rods are then reeled and sold for manufacture of electric wire or for steel stripping. Aluminum is also sold in remelt ingots. Annual production capacity of the plant is 82 000 t. In 1997, the plant operated at 80% capacity and employed a work force of 50.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Aluminum
- Magnesium
- Iron
- Titanium
- Boron
- Chromium
- Silicon
- Copper

FINISHED PRODUCTS

- Aluminum rods
- Remelt ingots

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Low flowrate, small loads

According to company data, in 1993 the plant discharged 24.0 m^3/d of effluent, containing notably:

- 2.76 kg/d of suspended solids (SS)
- 0.87 kg/d of total oil and grease (O&G)
- 0.126 kg/d of aluminum
- 0.06 kg/d of iron

RESOURCES AND USES TO PRESERVE

A wide variety of habitats

The SOCIETE CANADIENNE DE METAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant is located in the Bécancour industrial park along the banks of the St. Lawrence River. The plant discharges industrial waste to a ditch (considered an industrial sewer under municipal bylaw) more than 1.7 km from the river. The complex, natural morphology of the river in the area promotes a wide diversity of wildlife habitats. Water plant communities grow in the infralittoral area facing the park. A large mud flat rises in the middle of the St. Lawrence immediately downstream from the Bécancour wharf. The water plant communities in the area are considered attractive spawning and nursery areas for northern pike, perch, brown bullhead and smallmouth bass. Over 70 species of fish and at least 26 bird species may be found in the vicinity. Hunting and fishing enthusiasts visit the Bécancour area, and sport fishing and muskrat trapping are particularly popular at the mouth of the Gentilly River. The nuclear power station draws drinking water and industrial water a short distance downstream from the Bécancour wharf.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for the SOCIETE CANADIENNE DE METAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant have been calculated and are available on request.

EFFLUENT TREATMENT

Two ultrafiltration units

Since March 1997, industrial wastewater has been treated by two ultrafiltration units installed in series and then aerated in cooling towers to lower oxygen demand. The treated water is then discharged to the industrial ditch that empties into the St. Lawrence. Domestic sewage will be channelled to the industrial park's sewer system.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Reduction in wastewater

A major effort has been made to reduce the amount of industrial water used in the process. As well, effluent from the mechanical broom is now stored in a tank and then shipped to an authorized site for treatment. This last measure has reduced the amount of wastewater discharged to the sewer system by 0.6 to 0.8 m^3/d.

REGULATORY COMPLIANCE - WATER COMPONENT

Standards met

The SOCIETE CANADIENNE DE METAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant in Bécancour complies with standards stipulated in its certificate of authorization for effluent discharge. These standards are stricter than those for discharges to municipal systems.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Very low Chimiotox index

The Chimiotox index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (Table 1).

Table 1 gives SLV 2000 characterization data collected in May 1995 and the Chimiotox values estimated from them, assuming an effluent flowrate of 48 m^3/d. Three substances were detected in testing for more than 120. The Chimiotox index for the three substances detected is very low.

Figure 1 is plotted from company monthly data for 1993 and 1995, adjusted for the 1995 SLV 2000 copper characterization. The extrapolations for 1994 are based on company monthly data for 1993, adjusted for the 1995 SLV 2000 copper characterization. The projections for 1996 to 1998 are based on company monthly data for 1995, adjusted for the 1995 SLV 2000 copper characterization. The Chimiotox index of the SOCIÉTÉ CANADIENNE DE MÉTAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant is among the lowest of those of the SLV 2000 plants.

Table 1 ***Chimiotox Index (1995) - Société Canadienne de Métaux Reynolds, div. Usine de tige Reynolds****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total oil and grease	0.038	100	4
Total copper	0.006	451	3
Total phosphorous	0.015	50	1
CHIMIOTOX INDEX			**8**

* Assuming an effluent flowrate of 48 m^3/d (3 substances detected in testing for more than 120)

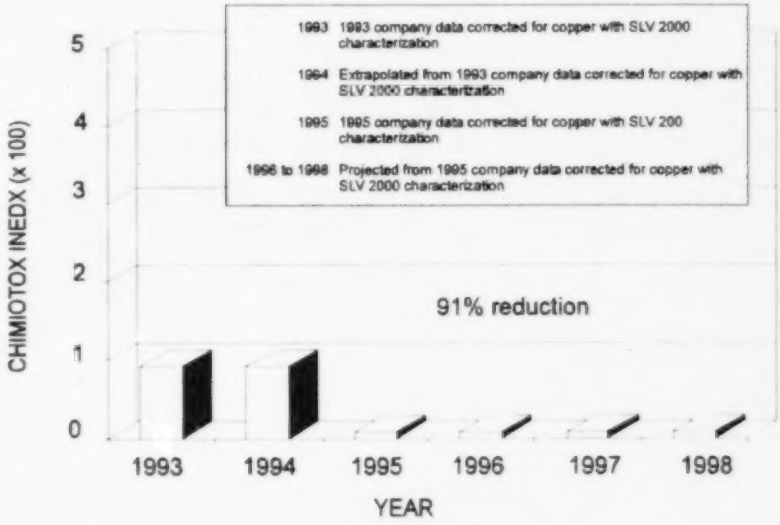


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Société Canadienne de Métaux Reynolds, div. Usine de tige Reynolds***

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Low flowrate, small loads

According to company data, in 1993 the plant discharged 24.0 m^3/d of effluent, containing notably:

- 2.76 kg/d of suspended solids (SS)
- 0.87 kg/d of total oil and grease (O&G)
- 0.126 kg/d of aluminum
- 0.06 kg/d of iron

RESOURCES AND USES TO PRESERVE

A wide variety of habitats

The SOCIETE CANADIENNE DE METAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant is located in the Bécancour industrial park along the banks of the St. Lawrence River. The plant discharges industrial waste to a ditch (considered an industrial sewer under municipal bylaw) more than 1.7 km from the river. The complex, natural morphology of the river in the area promotes a wide diversity of wildlife habitats. Water plant communities grow in the infralittoral area facing the park. A large mud flat rises in the middle of the St. Lawrence immediately downstream from the Bécancour wharf. The water plant communities in the area are considered attractive spawning and nursery areas for northern pike, perch, brown bullhead and smallmouth bass. Over 70 species of fish and at least 26 bird species may be found in the vicinity. Hunting and fishing enthusiasts visit the Bécancour area, and sport fishing and muskrat trapping are particularly popular at the mouth of the Gentilly River. The nuclear power station draws drinking water and industrial water a short distance downstream from the Bécancour wharf.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for the SOCIETE CANADIENNE DE METAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant have been calculated and are available on request.

EFFLUENT TREATMENT

Two ultrafiltration units

Since March 1997, industrial wastewater has been treated by two ultrafiltration units installed in series and then aerated in cooling towers to lower oxygen demand. The treated water is then discharged to the industrial ditch that empties into the St. Lawrence. Domestic sewage will be channelled to the industrial park's sewer system.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Reduction in wastewater

A major effort has been made to reduce the amount of industrial water used in the process. As well, effluent from the mechanical broom is now stored in a tank and then shipped to an authorized site for treatment. This last measure has reduced the amount of wastewater discharged to the sewer system by 0.6 to 0.8 m^3/d.

REGULATORY COMPLIANCE - WATER COMPONENT

Standards met

The SOCIETE CANADIENNE DE METAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant in Bécancour complies with standards stipulated in its certificate of authorization for effluent discharge. These standards are stricter than those for discharges to municipal systems.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Very low Chimiotox index

The Chimiotox index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (Table 1).

Table 1 gives SLV 2000 characterization data collected in May 1995 and the Chimiotox values estimated from them, assuming an effluent flowrate of 48 m^3/d. Three substances were detected in testing for more than 120. The Chimiotox index for the three substances detected is very low.

Figure 1 is plotted from company monthly data for 1993 and 1995, adjusted for the 1995 SLV 2000 copper characterization. The extrapolations for 1994 are based on company monthly data for 1993, adjusted for the 1995 SLV 2000 copper characterization. The projections for 1996 to 1998 are based on company monthly data for 1995, adjusted for the 1995 SLV 2000 copper characterization. The Chimiotox index of the SOCIETE CANADIENNE DE METAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant is among the lowest of those of the SLV 2000 plants.

Table 1 ***Chimiotox Index (1995) - Société Canadienne de Métaux Reynolds, div. Usine de tige Reynolds****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total oil and grease	0.038	100	4
Total copper	0.006	451	3
Total phosphorous	0.015	50	1
CHIMIOTOX INDEX			**8**

* Assuming an effluent flowrate of 48 m^3/d (3 substances detected in testing for more than 120)

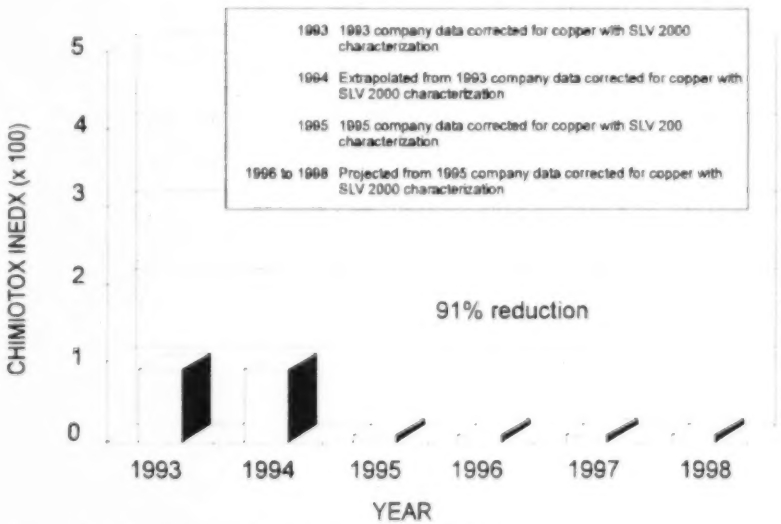


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Société Canadienne de Métaux Reynolds, div. Usine de tige Reynolds***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

None of the eleven targeted persistent and bioaccumulative toxic substances were detected in effluent from the SOCIÉTÉ CANADIENNE DE MÉTAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant during the May 1995 SLV 2000 characterization.

PEEP TOXICITY REDUCTION

Low PEEP

The Potential Ecotoxic Effects Probe, or PEEP, combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the SOCIÉTÉ CANADIENNE DE MÉTAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS plant, a series of bioassays of effluent was conducted in 1995 on a small percentage of effluent (2.4 m^3/d), yielding a PEEP of 1.9, which is low.

REDUCTION IN SUBSTANCES MONITORED

Load variations

According to company data, in 1997 the plant discharged 63.1 m^3/d of effluent, containing notably:

- 1.58 kg/d of suspended solid (SS)
- 0.152 kg/d of total oil and grease (O&G)
- 0.39 kg/d of aluminum
- 0.042 kg/d of iron

Between 1993 and 1997, oil and grease loads dropped 83%, suspended solids loads dropped 43%, and aluminum and iron loads increased 209% and 70% respectively. The decline in loads is due to cutbacks in chemical use and the installation of two ultrafiltration units.

KEY POINTS

- **One of the lowest Chimiotox indexes among SLV 2000 plants**
- **A more than 90% drop in the Chimiotox index**

Information updated January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Pierre Chainé (819) 371-6581 #2007

Environment officer at the SOCIÉTÉ CANADIENNE DE MÉTAUX REYNOLDS, DIV. USINE DE TIGE REYNOLDS:
François Demers (819) 294-2900, ext. 222

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/80-1998E
ISBN 0-662-26548-3
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

FACT SHEET 81

Stelco McMaster Ltée

2050 route des Aciéries
Contrecoeur, Quebec
J0L 1C0

***A** list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.*

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The STELCO MCMASTER LTÉE plant in Contrecoeur is in Group 2, which comprises plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Manufactures steel billets and rolled steel products

The STELCO MCMASTER LTÉE plant in Contrecoeur manufactures steel billets and rolled steel products from scrap iron and iron alloys. The scrap iron and alloys are melted in an electric-arc furnace, refined in a ladle furnace, and then continuously cast. The billets are shaped hot and then rolled before packaging. Annual production capacity of the plant has gone from 450 000 t to 590 000 t. In 1997, the plant operated at 77% capacity and employed a work force of 430.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Scrap iron
- Iron alloys
- Lime

FINISHED PRODUCTS

- Steel billets
- Rolled steel products (steel reinforcing bars, special quality bars, railroad elements)
- Rolled steel products used in manufacturing spring flats for recreational vehicles and trucks

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Suspended solids and iron

According to company data, in 1993 the plant discharged 32 700 m^3/d of effluent, containing notably:

- 256 kg/d of suspended solids (ss)
- 19 kg/d of iron

A substantial but variable percentage of the ss comes from the influent.

RESOURCES AND USES TO PRESERVE

Important aquatic environment

STELCO McMASTER LTEE discharges its effluent into the St. Lawrence River immediately upstream of the Contrecoeur harbour (upstream of the Contrecoeur islands on the south side). The current is slow here, and the waters shallow. Many species of fish frequent the nearshore, the channels between the islands (which are a National Wildlife Area) and the waters around them. The islands are also nesting areas for waterfowl and the channels are vast still-water spawning grounds. The Contrecoeur area is popular for pleasure boating, sailing and sport fishing. Brown bullhead, northern pike and muskellunge attract fishermen to the area. In addition to private wharves and the Contrecoeur marina, there is also a federal government wharf here. Contrecoeur draws its drinking water from the river 4.4 km downstream from the plant's discharge point.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for STELCO McMASTER LTEE are available on request.

EFFLUENT TREATMENT

Clarification and settling

The industrial wastewater includes direct cooling water from the steel plant and flush water from the scale produced in the rolling plant. The wastewater goes first into settling pits, where the suspended scale is recovered, and then into a settling and cooling pond. Some of the treated water is recirculated; the rest is discharged to a ditch. Indirect cooling water, drainage and runoff water are channelled to the settling pond. Domestic sewage from the different facilities is treated in three activated sludge treatment systems and six septic tanks with tile fields.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Reduced wastewater discharges

In 1994, a study was undertaken to find ways of reducing wastewater discharges. Work was carried out in 1995 and 1996 to, among other things, transport scale; this has resulted in a 32% reduction in the winter wastewater flowrate (8 months). A new settling tank was built to pretreat rolling-plant flush water.

REGULATORY COMPLIANCE - WATER COMPONENT

No specific regulations

The STELCO McMASTER LTEE plant in Contrecoeur is not subject to any specific regulations governing effluents.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly iron

The Chimiotox index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (Table 1).

Table 1 gives data from the May 1996 SLV 2000 characterization along with the Chimiotox values calculated from them, assuming an effluent flowrate of 22 300 m3/d. Four substances were selected in testing for more than 120. According to these data, iron accounts for 64% of the Chimiotox index.

Figure 1 is plotted from 1996 SLV 2000 characterization data. The Chimiotox index calculated from these data was reported unchanged for 1993 to 1998.

Table 1 ***Chimiotox Index (1996) - Stelco-McMaster Ltée****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total iron	53.398	3.3	176
Total nickel	8.445	10	84
Total manganese	0.967	10	10
Total aluminum	0.405	11	4
CHIMIOTOX INDEX			**274**

* Assuming an effluent flowrate of 22 300 m3/d (4 substances selected in testing for more than 120).

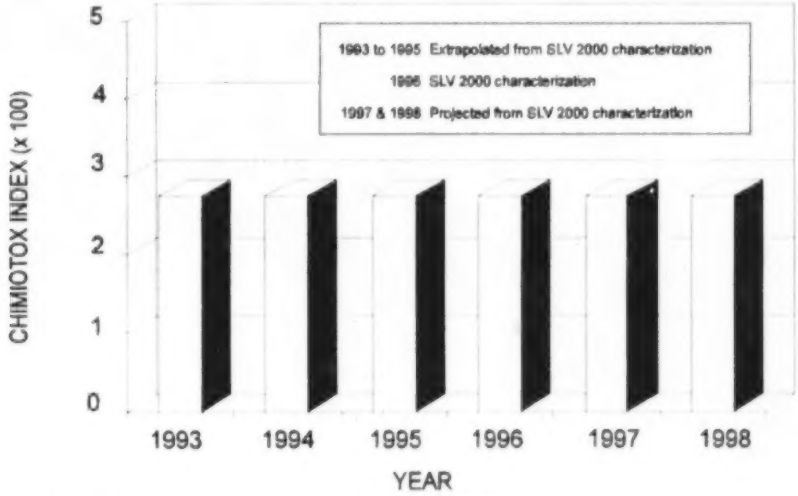


Figure 1 **Chimiotox Index Trends (1993 to 1998) Stelco McMaster Ltée**

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

Based on 1996 SLV 2000 characterization data, none of the eleven persistent and bioaccumulative substances was detected in the company's effluent.

PEEP TOXICITY REDUCTION

Low toxicity

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from1 to 10, and are used to monitor discharge trends over the years. In the case of the STELCO MCMASTER LTEE plant in Contrecoeur, a series of bioassays was carried out in 1996, yielding a PEEP of less than 2.0, and showing low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Flowrate and ss reductions

According to company monthly data, in 1997 the plant discharged an estimated 22300 m^3/d of effluent, containing notably:

- 156 kg/d of suspended solids (ss)
- 42 kg/d of iron

The effluent flowrate decreased 32%. A substantial proportion of suspended solids and iron loads comes from the influent, the amount varying as a function of time and parameter. Between 1993 and 1997, gross suspended solids loads decreased by 39% while gross iron loads increased by 121%.

KEY POINTS

- **Winter flowrate cut by 32% by recycling**
- **Construction of a new settling pond for rolling-plant flush water**
- **Increased production capacity**

Information updated January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 # 4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Yvon Goulet (514) 370-3085

Environment officer at STELCO MCMASTER LTÉE:
Luc Chabot (514) 652-1112

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/81-1998E
ISBN 0-662-26549-1
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

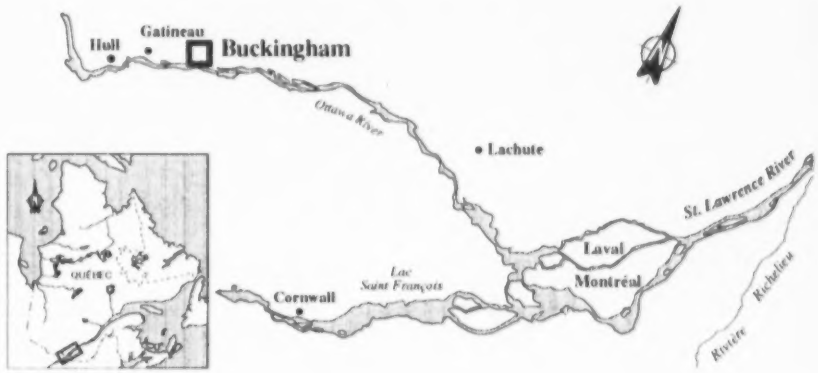
INDUSTRIAL PLANTS

Highlights

FACT SHEET 82

Sterling Pulp Chemicals

101 Donaldson Rd.
Buckingham, Quebec
J8L 3X3



***A** list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.*

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The STERLING PULP CHEMICALS plant, in Buckingham is part of Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Sodium chlorite and chlorate production

The STERLING PULP CHEMICALS plant in Buckingham includes sodium chlorate and sodium chlorite production facilities. The sodium chlorate is produced by electrolysis of a purified solution of sodium chloride. The plant has three electrolysis lines. The sodium chlorate solution is crystallized and then dried to obtain product in crystal form. In the preparation of sodium chlorite, the sodium chlorate reacts with hydrochloric acid to form gaseous chlorine dioxide. The chlorine dioxide reacts with caustic soda and hydrogen peroxide to form a sodium chlorite solution. The finished product is shipped in solution form. The rated production capacity of the sodium chlorate plant is 123 500 t/yr., while the sodium chlorite plant can produce up to 3750 t/yr. In 1997, the first plant worked at 92% capacity and the second at 80.5% capacity. The two plants employed a total work force of 93.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Hydrochloric acid
- Sodium hydroxide (caustic soda)
- Hydrogen peroxide
- Sodium chloride
- Sodium dichromate
- Sodium carbonate
- Calcium chloride
- Filtration aid
- Algicide
- Anti-corrosion treatment
- Sodium metabisulphite

FINISHED PRODUCTS

- Sodium chlorate
- Sodium chlorite

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Mainly sulphates

Based on company data, in 1993 the plant discharged of 125 m^3/d of effluent, containing notably:

- 57.6 kg/d of sulphates
- 38.4 kg/d of sodium chloride
- 18.1 kg/d of sodium chlorate
- 1.4 kg/d of sodium chlorite
- 0.07 kg/d of sodium dichromate

RESOURCES AND USES TO PRESERVE

Fish species

The STERLING PULP CHEMICALS plant in Buckingham is located on the right bank of the Lièvre river upstream from the MacLaren and Cascades Énergie dams and the Albright & Wilson Americas Limited plant. Despite the dams downstream of the wastewater discharge point, at least 14 fish species have been identified in the area. Light water sports are popular near the confluence of the Lièvre and Ottawa rivers.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for STERLING PULP CHEMICALS have been calculated and are available on request.

EFFLUENT TREATMENT

Chemical treatment

Condensation from the sodium chlorite plant contains free chlorine and chlorine dioxide. The water is treated with sodium metabisulphite and then neutralized with sodium carbonate. Free chlorine and chlorine dioxide are then converted into sodium sulphate and sodium chloride. The water is then discharged directly into the Lièvre river with the cooling water. Domestic sewage flows into a tile drainage bed.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Improved control

In August 1994, urea used in the sodium chlorate process was replaced by hydrogen peroxide, thus eliminating urea discharge into the river. In addition, in November 1994, quality control on effluent from the sodium chlorite plant was improved. High-conductivity effluent is now being held pending corrective measures.

REGULATORY COMPLIANCE - WATER COMPONENT

Certificate of authorization

A certificate of authorization (CA) was issued on February 22, 1994 for the installation and operation of two boilers to use hydrogen gas emissions as fuel and for a new domestic sewage treatment system. The company satisfies the CA standards. STERLING PULP CHEMICALS plants are not subject to any specific regulations on liquid industrial waste.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly furans

The Chimiotox index gauges the load of all toxic substances present in industrial effluent, using the toxicity factors assigned to each contaminant. It is used, among other things to monitor discharge trends over the years (see Figure 1) and determine the toxic contribution of each pollutant (see Table 1).

Table 1 shows data from the characterization carried out in August 1995 for SLV 2000 as well as the Chimiotox values calculated from them, assuming an effluent flowrate of 352 m^3/d. Five substances were selected in testing for more than 120. Based on these data, furans predominated in the treated water; expressed in 2,3,7,8-T_4CDD equivalent, furans represent 95% of the value of the Chimiotox index.

Figure 1 is plotted from August 1995 SLV 2000 characterization data. The Chimiotox index calculated from the SLV 2000 characterization data was reported unchanged for 1993 to 1998. The influence of improvements made by the company was impossible to quantify and is not reflected in the figure.

Table 1 ***Chimiotox Index (1995) - Sterling Pulp Chemicals****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
2,3,7,8-T_4CDD equivalent	1.3×10^{-8}	71 428 571 429	940
Total phosphorus	0.71	50	36
Total chromium	0.01	500	6
Total oil and grease	0.04**	100	4
Nitrites-nitrates	0.12	5	1
CHIMIOTOX INDEX			**987**

* Assuming an effluent flowrate of 352 m^3/d (5 substances selected in testing for more than 120).

** Load calculation based on analytical data which are near methodological detection limits.

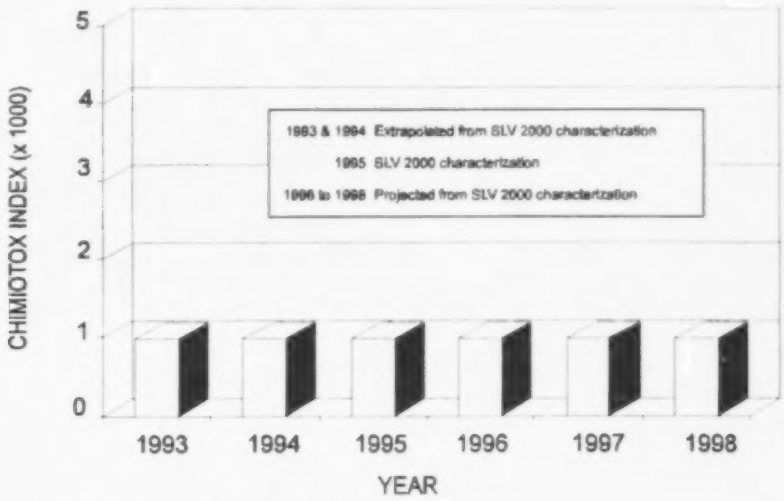


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Sterling Pulp Chemicals***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

The 1995 SLV 2000 characterization revealed the presence of furans. The furan concentration was 37.9 pg/L calculated in 2,3,7,8-T_4CDD equivalent. In the case of STERLING PULP CHEMICALS, the environmental discharge objective calculated for furans is 1.4 pg/l in 2,3,7,8-T_4CDD equivalent. An action plan was implemented to identify the source of the problem. A certain number of sampling series carried out identified two probable sources. It seems that one of the inputs comes from certain raw materials (HCl) while the other results from a slow deterioration of certain glass fibre equipment in the production process sequence. Research is continuing to find solutions in order to reduce or eliminate these sources of furans.

PEEPTOXICITY REDUCTION

Low toxicity

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the STERLING PULP CHEMICALS plant, a series of bioassays was carried out in 1995, yielding a PEEP value of 2.8, and showing a low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Increased production

Based on company data, in 1997 the plant had an effluent discharge of 223 m^3/d, containing notably:

- 60.6 kg/d of sulphates
- 104.5 kg/d of sodium chloride
- 7.4 kg/d of sodium chlorate
- 0.8 kg/d of sodium chlorite
- 0.006 kg/d of sodium dichromate

From 1993 to 1997, production at the sodium chlorate and sodium chlorite plants increased, causing an increase in sodium chloride load.

KEY POINTS

- **Implementation of a new domestic sewage treatment system in 1994**
- **Urea eliminated from process and effluent quality control improved in 1994**
- **Research to reduce or eliminate furans**

Information updated January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune (MEF):
Lazar Repciuc (819) 772-3434 # 262

Environment officer at STERLING PULP CHEMICALS:
Georges Roy (819) 986-1135, ext. 406

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998 Catalogue No. En153-6/82-1998E
ISBN 0-662-26550-5
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune

Saint-Laurent Vision 2000

INDUSTRIAL PLANTS

Highlights

FACT SHEET 83

Albright & Wilson Americas Limited

470 Erco St.
Buckingham, Quebec
J8L 1E1

***A** list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.*

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The ALBRIGHT & WILSON AMERICAS LIMITED plant in Buckingham is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Phosphate production

The ALBRIGHT & WILSON AMERICAS LIMITED plant in Buckingham includes five shops producing complex phosphates, hexametaphosphate, phosphate crystals, monocalcium phosphate and tricalcium phosphate. The plant has also produced dicalcium phosphate since 1995. The complex phosphate shop produces monosodium phosphate, disodium phosphate anhydrous, sodium tripolyphosphate and sodium acid pyrophosphate through a reaction of phosphoric acid (H_3PO_4) with sodium carbonate (soda ash or Na_2CO_3). Similarly, sodium hexametaphosphate is obtained through a reaction of phosphoric acid with sodium carbonate in specific quantities. Disodium phosphate duohydrate and trisodium phosphate dodecahydrate are produced in a vacuum process in the form of phosphate crystals, while monocalcium and tricalcium phosphates are obtained by a reaction of phosphoric acid with calcium hydroxide ($Ca(OH)_2$), combined in proportions depending on the product desired. Annual production capacity of the plant is 35 000 t. In 1997, the plant worked at 97% capacity and employed a work force of 123.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Phosphoric acid
- Sodium carbonate
- Sodium hydroxide
- Calcium oxide (quicklime)
- Aluminum phosphate

FINISHED PRODUCTS

- Sodium acid pyrophosphate (SAPP)
- Sodium tripolyphosphate (STPP)
- Monosodium phosphate (MSP)
- Disodium phosphate anhydrous (DSP/A)
- Disodium phosphate duohydrate (DSP-2)
- Trisodium phosphate dodecahydrate (TSP-12)
- Sodium hexametaphosphate (SHMP)
- Monocalcium phosphate (MCP)
- Dicalcium phosphate (DCP)
- Tricalcium phosphate (TCP)

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Mainly phosphorus in the form of phosphates

Based on company data, in 1993 the plant discharged 3081 m^3/d of effluent, containing notably:

- 260.4 kg/d of dissolved solids
- 52.9 kg/d of sodium chloride
- 48.2 kg/d of chemical oxygen demand (COD)
- 16.6 kg/d of biochemical oxygen demand (BOD_5)
- 9.3 kg/d of suspended solids (SS)
- 7.4 kg/d of total phosphorus
- 3.6 kg/d of sodium chlorate
- 0.013 kg/d of arsenic

RESOURCES AND USES TO PRESERVE

Fish species

The ALBRIGHT & WILSON AMERICAS LIMITED plant in Buckingham is located on the banks of the Lièvre river upstream from the MacLaren and Cascades Énergie Dam. Despite the dams downstream of the wastewater discharge point, at least 14 fish species have been identified in the area. Light water sports are popular near the confluence of the Lièvre and Ottawa rivers.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environnmental discharge objectives for ALBRIGHT & WILSON AMERICAS LIMITED have been calculated and are available on request.

EFFLUENT TREATMENT

Water recirculation

Cooling water is partially recycled while domestic sewage is discharged into settling tanks before being discharged into the river with industrial wastewater.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Phosphates discharge reduced

Since 1981, the plant has reduced phosphate discharges by 94% by modifying or closing various sections.

The company is negotiating with the municipality of Buckingham for authorization to discharge domestic sewage from the plant into the future municipal sewage treatment plant.

REGULATORY COMPLIANCE - WATER COMPONENT

No specific regulations

The ALBRIGHT & WILSON AMERICAS LIMITED plant in Buckingham is not subject to any specific regulations regarding industrial wastewater.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly mercury

The Chimiotox index gauges the load of all toxic substances present in industrial effluent using the toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (see Figure 1) and determine the toxic contribution of each pollutant (see Table 1).

Table 1 shows data from the characterization carried out in August 1995 for SLV 2000 as well as the Chimiotox values estimated from them, for an effluent flowrate of 3184 m^3/d. Seven substances were selected intesting for more than 120. Based on these data, total mercury accounts for 54% of the Chimiotox index.

Figure 1 is based on August 1995 SLV 2000 characterization data and, for mercury, on September 1996 company data. The Chimiotox index based on 1995 SLV 2000 characterization data was reported unchanged for 1993 to 1995. The Chimiotox index was adjusted in 1996 to reflect the repeated characterization for mercury. These data were reported for 1997 and 1998.

Table 1 ***Chimiotox Index (1995) - Albright & Wilson Americas Limited****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total mercury	2.7×10^{-3}	166 667	445
Total phosphorus	6.60	50	330
Total hydrocarbons (Mineral oil and grease)	0.42**	100	42
Total aluminum	0.48	11	5
Total iron	0.97	3,3	3
Total vanadium	0.02**	71	2
Nitrites-nitrates	0.20	5	1
CHIMIOTOX INDEX			**823**

* Assuming an effluent flowrate of 3184 m^3/d (7 substances selected in testing for more than 120).

**Load calculation based on analytical data which are near methodological detection limits.

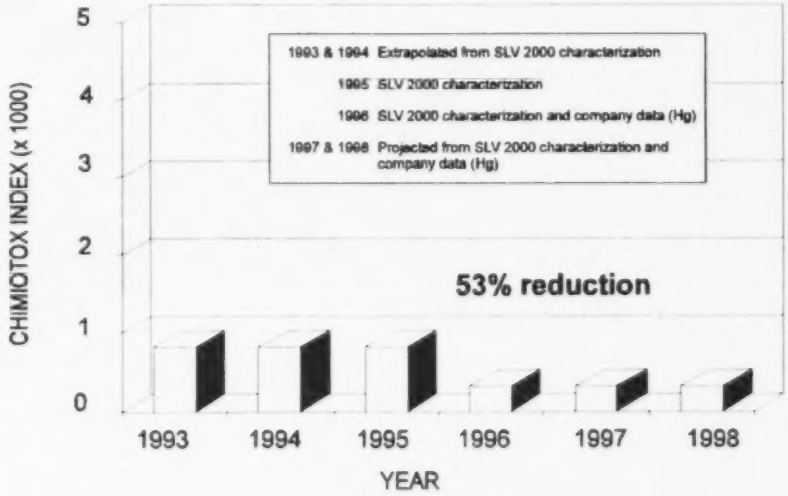


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Albright & Wilson Americas Limited***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 priority plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(*a*)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

The 1995 characterization for SLV 2000 showed the presence of mercury. However, a new characterization for this parameter carried out in September 1996 showed that mercury is present but in a concentration near methodological detection limits which correspond to the environmental discharge objective.

PEEP TOXICITY REDUCTION

Non-toxic effluent

The Potential Ecotoxic Effects Probe, or PEEP, combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the ALBRIGHT & WILSON AMERICAS LIMITED plant, a series of bioassays was carried out in 1995, yielding a PEEP of less than 1.3 and showing no toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Effluent stable

Based on company data, in 1997 the plant discharged of 2436 m^3/d of effluent, containing notably:

- 236.5 kg/d of dissolved solids
- 53.1 kg/d of sodium chloride
- 29.8 kg/d of chemical oxygen demand (COD)
- 26.2 kg/d of biochemical oxygen demand (BOD_5)
- 8.5 kg/d of total phosphorus
- 2.1 kg/d of sodium chlorate
- 2.6 kg/d of suspended solids (SS)
- <0.001 kg/d of arsenic

The stability of effluent loads is due to the fact that there were no major changes in the treatment system and manufacturing operations from 1993 to 1997, despite a 30% increase in production.

KEY POINTS

- **Negotiations with the municipality of Buckingham to discharge domestic sewage to the future municipal sewage treatment plant**
- **A 53% decrease of the Chimiotox index**
- **Non-toxic effluent**

Information updated January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 #4767

Records officer at the Ministère de l'Environnement et de la Faune (MEF):
Lazar Repciuc (819) 772-3434 ext. 262

Environment officer at ALBRIGHT & WILSON AMERICAS LIMITED:
Bertin Ouellet (819) 986-4913

Production team:
Environment Canada
Isabelle Bouchard Thérèse Drapeau
Gilles Legault Lucie Olivier
Sylvie Roberge Marc Villeneuve

Ministère de l'Environnement et de la Faune du Québec
Francine Richard
François Rocheleau

Internet address:
http://www.slv2000.qc.ec.gc.ca/

Published by authority of the Minister of the Environment
© Public Works and Government Services Canada 1998
Catalogue No. En153-6/83-1998E
ISBN 0-662-26551-3
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)

This paper contains over 55% recycled fibre including 10% postconsumer fibre.

Environment Canada Environnement Canada

Gouvernement du Québec
Ministère de l'Environnement et de la Faune